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3 April 1964

MEMORANDUM FOR: Chief, D/M/FW

THROUGH: Chief, D/MS

THROUGH: Chief, ERA

THROUGH: Chief, D/M

FROM: Chief, MS/CST

SUBJECT: Contribution to ORR Project No. 57.4241, UAR Military Program

REFERENCE: Memorandum of 22 January 1964 from Chief, Free World Branch, D/M to Chief, Construction Branch, D/MS, ORR

1. MS/CST has prepared this contribution in reply to a request by D/M/FW for a construction cost study of Egyptian Military factories, and includes the Helwan Jet Aircraft Plant (#36/135), the Helwan Aluminum Plant and Allied Industry (#63/99), and the Al Qahirah Rocket Plant (#333).

2. The description of the facilities and dimensional data used in the preparation of this contribution have been taken from studies prepared by CIA/PID/C 1706/63, C 314/64, and C 187/64, and supplemented by M/FW collateral files.

3. The results of the costing and timing of work are included here in two tabular tables and one graph for each of the three military factories. The detailed data supporting the cost and time estimates are maintained in the files of MS/CST for reference and future additions or corrections.

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[redacted]

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ORR/MS/CST: [redacted] Syl/6510 (3 Apr 64)

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MS/CST Contribution to

(ORR Project No. 57.4241)

UAR MILITARY PROGRAM

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Analyst: [redacted] MS/CST
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3 April 1964

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METHODOLOGY

In the absence of comparable data permitting analysis based on U.S. analogy, unit costs of construction for the territorial zone of the USSR commensurate with Egypt were taken from appropriate volumes of the series of pamphlets: (Sbornik Ukrupnennikh Pokazatelei Stoimosti Zdanii i Sooruzhenii dlya Pereotsenki Osnovnykh Fondov, (A collection of Soviet Handbooks of Consolidated Indices of the Cost of Buildings and Structures for Reevaluation of Fixed Capital Assets).

The costs in this contribution cover only the cost of "bricks and mortar" work and do not include the cost of any equipment or its installation (except for housekeeping utilities -- heat, water, electricity, and sewer lines). All costs were computed in new rubles (in adjusted prices of 1 July 1955), and converted to 1955 US dollars at the rate of .71 rubles per 1 dollar.* Ancillary air facilities, however, were converted at the rate of 1 ruble per 1 dollar.**

EXAMPLE: (for computation of building costs)

Building: $\frac{\text{No. of Cubic Feet}}{\text{Cubic Feet/m}^3}$ = cubic meters x ru/m^3 = total cost in rubles x conversion factor (.71 ru/1 dollar) = total cost in 1955 US dollars

Foundry : $\frac{5,244,750 \text{ cu ft}}{35.315 \text{ cu ft}}$ = 148,513 m^3 x 8.8 ru/m^3 = 1,306,914 ru x .1408 = $1,840,135

The annual and total costs calculated for plant buildings were increased by 25% to cover site preparation (5%), housekeeping utilities (15%) and overall engineering and inspection (5%). These percentages are based on U.S. experience and have proven

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* Ruble-Dollar Ratios in Construction in 1955.

** The one to one ratio is used because it is the subrate found for airfield construction which in the case of the jet aircraft plant involves more than half of the total cost.

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to be reasonable when applied to other areas of the world. Costs calculated for ancillary facilities, on the other hand, have been increased by 5% for overall engineering and inspection since the cost of site preparation is included in the unit cost of the facilities, and the 15% for housekeeping utilities is not applicable due to the absence of such utilities in ancillary facilities.

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HELWAN JET AIRCRAFT PLANT (#36/135), UAR

Table 1 - Total Construction Costs, 1949-63

Table 2 - Annual Construction Costs, 1949-63

Graph - Construction Schedule, 1949-63

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Table 1

Total Construction Costs of Helwan Jet Aircraft Plant (#36/135), UAR
1949 - 1963

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
1	Engine Test Facility	1	697,600	19,754	16.7	329,892	464,488
2	Engine Test Facility	1	697,600	19,754	16.7	329,892	464,488
3	Engine Test Facility	1	344,250	9,748	16.7	162,792	229,211
4	Shop	1	199,725	5,656	9.3	52,601	74,062
5	Warehouse	1	1,542,750	43,685	8.6	375,691	528,973
6	Shop	1	34,125	966	16.0	15,456	21,762
7	Shop	1	20,250	573	16.0	9,168	12,909
8	Warehouse	1	81,000	2,294	11.0	25,234	35,529
9	Warehouse	1	221,340	6,268	4.2	26,326	37,067
10	Warehouse	1	13,075	370	15.0	5,550	7,814
11	Warehouse	1	16,200	459	15.0	6,885	9,694
12	Warehouse	1	22,500	637	12.7	8,090	11,391
13	Warehouse	1	221,340	6,268	4.2	26,326	37,067
14	Warehouse	1	344,250	9,748	9.0	87,732	123,527
15	Warehouse	1	15,300	433	15.0	6,495	9,145
16	Shop	1	189,000	5,352	9.3	49,774	70,082
17	Shop	1	49,500	1,402	10.7	15,001	21,121

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
18	Shop	1	59,625	1,688	10.7	18,062	25,431
19	Engine Assembly	1	503,750	14,264	5.9	84,158	118,494
20	Admin/Research	4	632,310	17,905	17.4	311,547	438,658
21	Warehouse	1	33,750	956	12.7	12,141	17,095
22	Warehouse	1	42,000	1,189	12.4	14,744	20,760
23	Shop	1	88,425	2,504	10.7	26,793	37,724
24	Admin/Research	3	205,625	5,823	16.8	97,826	137,739
25	Shop	1	270,000	7,645	8.2	62,689	88,266
26	Garage	1	81,000	2,294	11.0	25,234	35,529
27	Garage	1	58,500	1,657	10.0	16,570	23,331
28	Fabrication	1	5,139,000	145,519	6.1	887,666	1,249,834
29	Shop	1	42,000	1,189	10.7	12,722	17,913
30	Hangar	1	552,500	15,645	4.2	65,709	92,518
31	Shop	1	131,400	3,721	10.3	38,326	53,963
32	Shop	1	76,500	2,166	10.3	22,310	31,412
33	Shop	1	378,000	10,704	8.7	93,125	131,120
34	Shop	1	68,850	1,950	10.7	20,865	29,378
35	Warehouse	1	127,840	3,620	11.0	39,820	56,067

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
36	Shop	1	57,375	1,625	10.7	17,388	24,482
37	Assembly	1	4,704,000	133,201	6.2	825,846	1,162,791
38	Admin/Research	3	769,500	21,790	17.4	379,146	533,838
39	Warehouse	1	81,000	2,294	11.0	25,234	35,529
40	Shop	1	382,750	10,838	8.7	94,291	132,762
41	Shop	1	22,500	637	16.0	10,192	14,350
42	Shop	1	2,820,000	79,853	7.4	590,912	832,004
43	Warehouse	1	430,355	12,186	5.3	64,586	90,937
44	Warehouse	1	156,825	4,441	11.0	48,851	68,782
45	Warehouse	1	278,400	7,883	9.0	70,947	99,893
46	Warehouse	1	440,000	12,459	7.3	90,951	128,059
47	Tank (905 sq. ft.)	-	--	--	[illegible]	1,881	2,648
48	Admin/Research	2	300,300	8,503	17.4	147,952	208,316
49	Shop	1	315,000	8,920	8.2	73,144	102,987
50	Admin/Research	2	224,900	6,368	17.4	110,803	156,011
51	Warehouse	1	630,000	17,839	5.3	94,547	133,122
52	Warehouse	1	650,250	18,413	5.3	97,589	137,405
53	Warehouse	1	650,250	18,413	5.3	97,589	137,405

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
54	Warehouse	1	892,500	25,273	5.3	133,947	188,597
55	Shop	1	1,006,500	28,501	7.8	222,308	313,010
56	U/I (foundation only)					6,611	9,308
57	Shop	1	39,600	1,121	10.7	11,995	16,889
--	Housing Area		282,520	8,000	17.9	143,200	201,626
--	(4) Semi-Perm Warehouses	1	282,520	8,000	9.2	73,600	103,629
--	U/I Bunkered Bldgs (fuel storage?)		137,729	3,900	18.3	71,370	100,489
	Sub Total					6,888,092	9,698,431
Additional Costs Not Included Above:							
Clearing and Grading of Site (5%)							
Utilities Lines (Electric, Gas, Water, Sewer, Heating) (15%)		25%				1,722,023	2,424,608
Overall Engineering and Inspection (5%)							
TOTAL FOR PLANT						8,610,116	12,123,039

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
Ancillary Facilities:							
	Rail Spur within plant 1.0 kilometer					40,600	57,165
	Roads within plant:						
	Extra Wide - 6.778 m^2					28,264	39,796
	Normal - 2.9 kilometers					84,680	119,229
	Fence (Probably Chain Link)					33,750	47,520
	Original Airfield (Built 1949-1952) - 292,750 m^2					15,223,000	15,223,000
	New Airfield (Built 1959)						
	Runway - 76,208 m^2 asphalt					6,591,230	6,591,230
	38,104 m^2 concrete					3,174,825	3,174,825
	Taxiway - 38,104 m^2 asphalt					3,150,820	3,150,820
	Parking - 38,448 m^2 concrete					3,327,290	3,327,290
	Sub-Total for Ancillary Facilities					31,654,459	31,730,875
	Overall Engineering and Inspection for Ancillary Facilities (5%)					1,582,723	1,586,544
	Total for Ancillary Facilities					33,237,182	33,317,419
TOTAL CONSTRUCTION COST, HELWAN JET AIRCRAFT PLANT (#36/135)						41,847,298	45,440,458
	ROUNDED					41,800,000	45,400,000

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Table 2

Annual Construction Costs - Helwan Jet Aircraft Plant (#36/135), UAR
1949 - 1963 a/

(in 1955 US dollars)

Number of Building	Type of Structure	1949-52	1953	1954	1955-56	1957-58	1959	1960	1961	1962	1963	Total Construction Costs
4	Shop	74,062										74,062
5	Storage-Hangar	528,973										528,973
6	Shop	21,762										21,762
7	Shop	12,909										12,909
14	Storage	123,527										123,527
16	Shop (Hangar)	70,082										70,082
17	Shop	21,121										21,121
20	Admin/Research (4 floors)	43,866							394,792			438,658
22	Storage (warehouse)	20,760										20,760
23	Shop	37,724										37,724
30	Hangar	92,518										92,518
34	Shop	29,378										29,378
37	Assembly	872,094	290,697									1,162,791
38	Admin/Research (3 floors)	37,369	496,469									533,838
39	Storage (warehouse)	35,529										35,529
42	Shop	499,202	332,802									832,004
43	Storage (warehouse)	45,469	45,468									90,937

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1949-52	1953	1954	1955-56	1957-58	1959	1960	1961	1962	1963	Total Construction Costs
Housing Area		201,626										201,626
(4)	Semi-Permanent Warehouses	103,629										103,629
33	Shop		131,120									131,120
35	Storage (warehouse)		56,067									56,067
U/I	Bunkered Bldgs. (probably fuel storage)		18,089	82,400								100,489
41	Shop			14,350								14,350
3	Engine Test Facility				229,211							229,211
19	Engine Assembly				59,247	59,247						118,494
21	Storage				17,095							17,095
48	Admin/Research (2 floors)				208,316							208,316
49	Shop				102,987							102,987
50	Admin/Research (2 floors)				156,011							156,011
40	Shop					132,762						132,762
51	Storage (warehouse)						133,122					133,122
9	Storage-Hangar								37,067			37,067
11	Storage								9,694			9,694
12	Storage								11,391			11,391
18	Shop								25,431			25,431

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1949-52	1953	1954	1955-56	1957-58	1959	1960	1961	1962	1963	Total Construction Costs
26	Garage								35,529			35,529
27	Garage								23,331			23,331
29	Shop								17,913			17,913
44	Storage								13,756	55,026		68,782
53	Storage (warehouse)								41,222	96,183		137,405
28	Fabrication									624,917	624,917	1,249,834
31	Shop									53,963		53,963
32	Shop									31,412		31,412
36	Shop									24,482		24,482
55	Shop									125,204	187,806	313,010
1	Engine Test Facility										464,488	464,488
2	Engine Test Facility										464,488	464,488
8	Storage										35,529	35,529
10	Storage										7,814	7,814
13	Storage										37,067	37,067
15	Storage										9,145	9,145
24	Admin/Research (3 floors)										137,739	137,739
25	Shop										88,266	88,266

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1949-52	1953	1954	1955-56	1957-58	1959	1960	1961	1962	1963	Total Construction Costs
45	Storage										99,893	99,893
46	Storage										128,059	128,059
47	Tank										2,648	2,648
52	Storage										137,405	137,405
54	Storage										188,597	188,597
56	U/I (foundation only)										9,308	9,308
57	Shop										16,889	16,889
	Sub-total	2,871,600	1,370,712	96,750	772,867	192,009	133,122		610,126	1,011,187	2,640,058	9,698,431
Costs not included above:												
Clearing and grading of site (5%) Utilities (electric, gas, water, sewer, heat) (15%) Overall Engineering and Inspection (5%)	25%	717,900	342,678	24,188	193,217	48,002	33,280		152,532	252,797	660,014	2,424,608
	Total	3,589,500	1,713,390	120,938	966,084	240,011	166,402		762,658	1,263,984	3,300,072	12,123,039

a Ancillary facilities including air facilities, rail spur, roads and fence are included in Table 1.

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NO. 341-10 DIETZGEN GRAPH PAPER
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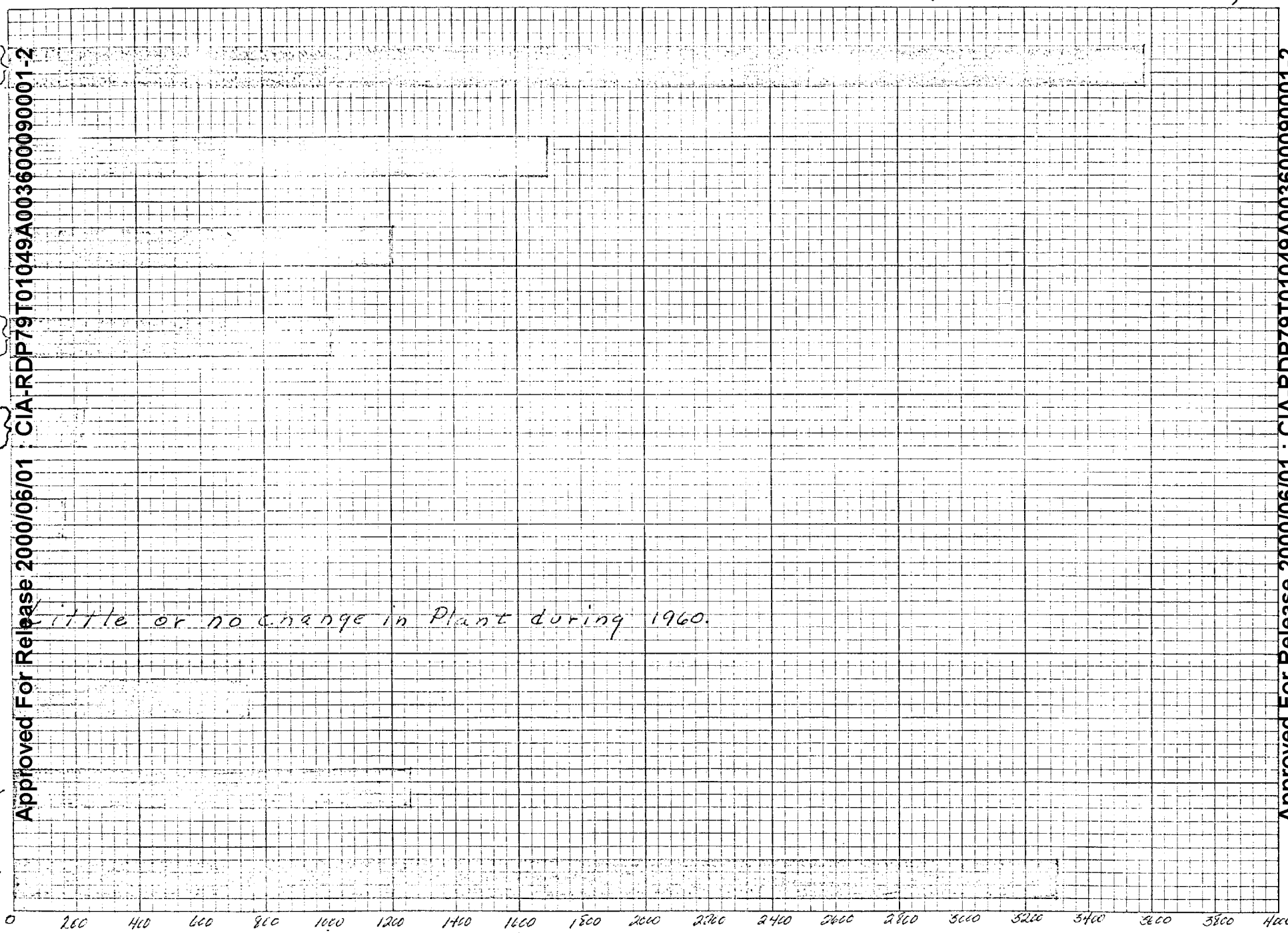
CONSTRUCTION SCHEDULE OF HELWAN JET AIRCRAFT PLANT (#36/135), UAR
1949 - 1963*

(in thousands 1955 US dollars)



* This schedule includes buildings and utilities of the Plant, but excludes the ancillary facilities listed in Table 1.

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HELWAN ALUMINUM PLANT AND ALLIED INDUSTRY (#63/99), UAR

Table 1 - Total Construction Costs, 1952-63

Table 2 - Annual Construction Costs, 1952-63

Graph - Construction Schedule, 1952-63

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Table 1

Total Construction Costs of Helwan Aluminum Plant and Allied Industry (#63/99), UAR
1952-63

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
1	Warehouse (shop)	1	2,249,100	63,687	7.4	471,284	663,568
2	Foundry	1	5,244,750	148,513	8.8	1,306,914	1,840,135
3	Warehouse	1	262,500	7,433	12.8	95,142	133,960
4	Admin/Research	2	334,100	9,460	17.4	164,604	231,762
5A	Research	2	150,150	4,252	15.6	66,331	93,394
5B	Fabrication	1	2,702,700	76,531	6.1	466,839	657,309
6	Warehouse	1	262,350	7,429	12.8	95,091	133,888
7	Warehouse	1	51,750	1,465	9.2	13,478	18,977
8	Warehouse	1	127,075	3,598	8.8	31,662	44,580
9	Warehouse	1	27,000	765	12.7	9,715	13,679
10	Admin/Research	2	348,920	9,880	17.4	171,912	242,052
11	Storage (Messhall)	1	81,250	2,301	20.6	47,401	66,741
12	Warehouse	1	787,500	22,299	5.3	118,185	166,404
13	Warehouse	1	877,500	24,848	5.3	131,694	185,425
14	Warehouse	1	47,600	1,348	9.2	12,402	17,462
15	Admin/Research	2	142,500	4,035	17.4	70,209	98,854

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
16	Admin/Research	1	117,000	3,313	17.4	57,646	81,165
17	Warehouse	1	191,250	5,415	6.6	35,739	50,320
18	Shop	1	500,000	14,158	7.4	104,769	147,515
19	Shop	1	306,000	8,665	8.7	75,385	106,142
20	Rolling Mill	1	5,442,075	154,101	8.4	1,294,448	1,822,583
21	Shop	1	532,800	15,087	8.7	131,257	184,810
22	Shop	1	258,375	7,316	8.7	63,649	89,618
23	Shop	1	43,875	1,242	10.7	13,289	18,711
24	Shop	1	45,000	1,274	10.7	13,632	19,194
25	Shop	1	45,000	1,274	10.7	13,632	19,194
26	Admin/Research	1	61,020	1,728	17.4	30,067	42,334
27	Fabrication	1	897,000	25,400	6.1	154,940	218,155
28	Fabrication	1	3,882,750	109,946	6.1	670,671	944,305
29	Fabrication	1	3,508,800	99,357	6.1	606,078	853,358
30	Shop	1	600,625	17,008	8.7	147,970	208,342
31	Warehouse	1	112,000	3,171	8.8	27,905	39,290
32	Warehouse	1	364,500	10,321	5.3	54,701	77,019

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
33	Fabrication	11	1,712,750	48,499	6.1	295,844	416,548
34	Research	2	303,000	8,580	17.4	149,292	210,203
35	Warehouse	11	34,425	975	12.7	12,382	17,434
36	Warehouse	1	369,750	10,470	5.3	55,491	78,131
37	Warehouse	1	107,100	3,033	8.8	26,690	37,579
38	Shop	1	1,864,050	52,783	8.7	459,212	646,570
39	Warehouse	1	25,500	722	12.7	9,169	12,910
40	Dispensary	1	48,750	1,380	20.4	28,152	39,638
41	Fabrication	1	2,407,800	68,181	6.1	415,904	585,593
42	Fabrication	1	685,850	19,421	6.1	118,468	166,803
43	Warehouse	1	56,525	1,600	9.2	14,720	20,726
44	Fabrication	1	2,933,350	83,062	6.1	506,678	713,803
45	Shop	1	175,000	4,955	9.8	48,559	68,371
46	Warehouse	1	67,500	1,911	9.2	17,581	24,754
47	Warehouse	1	508,750	14,406	5.3	76,352	107,504
48	Warehouse	1	309,690	8,769	8.8	77,167	108,651
49	Warehouse	11	68,250	1,933	9.2	17,784	25,040

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
50	Tower		37,240	1,054		20,500	28,864
51	Warehouse	1	570,000	16,140	5.3	85,542	120,443
52	Fabrication	1	2,254,000	63,825	6.1	389,332	548,179
53	Fabrication	1	1,892,550	53,590	6.1	326,899	460,274
54	Warehouse	1	252,450	7,148	8.8	62,902	88,566
55	Tank (908 sq ft)					1,881	2,648
56	Tank "					1,881	2,648
57	Tank "					1,881	2,648
58	Pumphouse	1	18,375	520	38.7	20,124	28,335
	Garage	1	49,590	1,404	10.0	14,040	19,768
	Garage	1	43,875	1,242	10.0	12,420	17,487
	Sub-Total					10,035,488	14,129,963
Additional Costs Not Included Above:							
Clearing and Grading of Site (5%) Utilities Lines (15%) Overall Engineering and Inspection (5%)		(25%)				2,508,872	3,532,491
TOTAL FOR PLANT BUILDINGS AND UTILITIES						12,544,360	17,662,454

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
Ancillary Facilities:							
	Railroads within plant - 4.25 kilometers @40,600 ru/km					172,550	242,950
	Roads within plant - 6.20 kilometers @29,200 ru/km					181,040	255,411
	Cable Network - 3.0 kilometers (6 kv) 5,730 ru/km					17,190	25,203
	Fence - 3,500 meters @5.2 ru/m					18,200	25,626
Sub-Total for Ancillary Facilities						388,980	549,190
	Overall Engineering and Inspection for Ancillary Facilities (5%)					19,449	27,459
Total for Ancillary Facilities						408,429	576,649
TOTAL CONSTRUCTION COSTS FOR HELWAN ALUMINUM AND ALLIED INDUSTRY (#63/99)						12,952,889	18,239,103
					ROUNDED	13,000,000	18,200,000

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Table 2

Annual Construction Costs of Helwan Aluminum Plant and Allied Industry (#63/99), UAR
1952 - 1963

(in 1955 US dollars)

Number of Building	Type of Structure	1952	1953	1954	1955-56	1957-58	1959	1960-61	1962	1963	Total Cost 1955 US Dollars
2	Rolling Mill	273,387	1,549,196								1,822,583
3	Admin/Research		81,165								81,165
4	Warehouse		107,504								107,504
7	Foundry				1,840,135						1,840,135
5	Admin/Research				231,762						231,762
6	Admin/Research				98,854						98,854
8	Shop				147,515						147,515
9	Shop				106,142						106,142
10	Shop				18,711						18,711
11	Fabrication				51,202	460,813	341,343				853,358
12	Shop				125,005	83,337					208,342
41	Warehouse (Shop)				39,290						39,290
16	Warehouse				78,131						78,131
19	Warehouse				12,910						12,910
43	Warehouse				20,726						20,726
44	Fabrication				713,403						713,403
48	Warehouse				108,651						108,651

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1952	1953	1954	1955-56	1957-58	1959	1960-61	1962	1963	Total Cost 1955 US Dollars
5	Fabrication				548,179						548,179
5	Fabrication				460,274						460,274
1	Admin/Research					121,026	121,026				242,052
1	Warehouse					4,529	45,791				50,320
3	Warehouse					5,391	71,628				77,019
3	Fabrication					166,619	249,929				416,548
3	Warehouse					37,579					37,579
4	Fabrication					292,796	292,797				585,593
4	Fabrication					83,401	83,402				166,803
5	Tank					2,648					2,648
5	Tank					2,648					2,648
5	Tank					2,648					2,648
Garage						19,768					19,768
	Warehouse						132,714	331,784	199,070		663,568
	Warehouse						13,679				13,679
2	Shop						89,618				89,618
24	Shop						19,194				19,194
25	Shop						19,194				19,194

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1952	1953	1954	1955-56	1957-58	1959	1960-61	1962	1963	Total Cost 1955 US Dollars
3	Research						157,652	52,551			210,203
3	Warehouse						17,434				17,434
3	Warehouse							66,980	66,980		133,960
4A	Research							56,036	37,358		93,394
4B	Fabrication							328,654	328,655		657,309
4	Warehouse							66,944	66,944		133,888
4	Warehouse							83,202	83,202		166,404
21	Shop							92,405	92,405		184,810
2	Admin/Research							42,334			42,334
2	Fabrication								109,077	109,078	218,155
2	Fabrication							472,152	377,722	94,431	944,305
5	Shop							68,371			68,371
1	Warehouse							120,443			120,443
6	Pumphouse							28,335			28,335
9	Warehouse								17,832	26,748	44,580
10	Warehouse (messhall)								66,741		66,741
13	Warehouse								46,356	139,069	185,425
14	Warehouse								17,462		17,462

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Table 2 (continued)

(in 1955 US dollars)

Number of Building	Type of Structure	1952	1953	1954	1955-56	1957-58	1959	1960-61	1962	1963	Total Cost 1955 US Dollars
3	Shop								387,942	258,628	646,570
5	Warehouse								88,566		88,566
	Warehouse									18,977	18,977
4	Dispensary									39,638	39,638
4	Warehouse									24,754	24,754
4	Warehouse									25,040	25,040
5	Tower									28,864	28,864
Garage										17,487	17,487
	Sub-total	273,387	1,737,865		4,600,890	1,283,203	1,655,401	1,810,191	1,986,312	782,714	14,129,963
Additional Costs not included above:											
	Clearing and Grading of Site (5%) Utilities Lines (15%) Over-all Engineering and Inspection (5%)	25% 68,347	434,466		1,150,223	320,801	413,850	452,548	496,578	195,678	3,532,491
	TOTAL	341,734	2,172,331		5,751,113	1,604,004	2,069,251	2,262,739	2,482,890	978,392	17,662,454

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CONSTRUCTION SCHEDULE OF HELWAN ALUMINUM PLANT AND ALLIED INDUSTRY (#63/99), UAR
1952 - 1963*

(in thousands 1955 US dollars)

* This schedule includes buildings and utilities of the Plant, but excludes the ancillary facilities listed in Table I.

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AL CAHIRAH ROCKET PLANT (#333), UAR

Table 1 - Total Construction Costs, Through March 1964

Table 2 - Schedule of Construction Costs, Selected Periods Through March 1964

Graph - Construction Schedule, Through March 1964

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Table 1

Total Construction Costs of Al Qahirah Rocket Plant (#333), UAR
Through March 1964

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
1	Fabrication	1	283,800	8,036	6.4	51,430	72,413
2	Explosives Storage	1	4,500	127	38.0	4,826	6,795
3	Explosives Storage	1	16,500	467	38.0	17,746	24,986
4	Explosives Storage	1	16,500	467	38.0	17,746	24,986
5	Explosives Storage	1	6,250	177	38.0	6,726	9,470
6	Explosives Storage	1	14,000	396	38.0	15,048	21,188
7	Explosives Storage	1	12,250	347	38.0	13,186	18,566
8	Explosives Storage	1	12,500	354	38.0	13,452	18,940
9	Explosives Storage	1	12,500	354	38.0	13,452	18,940
10	Shop	1	783,125	22,175	7.4	164,095	231,046
11	Shop	1	457,500	12,955	7.4	95,867	134,981
12	Shop	1	514,500	14,569	7.4	107,811	151,798
13	Shop	1	653,250	18,498	7.4	136,985	192,734
14	Office	1	10,000	283	14.7	4,160	5,857
15	Research	1	49,000	1,388	18.5	25,678	36,155

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
16	Cooling Tower (possible)			125/m^2	266/m^2	33,250	46,816
17	Shop	1	30,400	861	16.0	13,776	19,397
18	Warehouse	1	10,000	283	15.0	4,245	5,977
19	Warehouse	1	10,000	283	15.0	4,245	5,977
20	Warehouse	1	10,000	283	15.0	4,245	5,977
21	Warehouse	1	10,000	283	15.0	4,245	5,977
22	Warehouse	1	10,000	283	15.0	4,245	5,977
23	Warehouse	1	10,000	283	15.0	4,245	5,977
24	Shop	1	322,000	9,118	8.7	79,327	111,692
25	Fuel Storage (?)	1	10,000	283	19.2	5,434	7,651
26	Fuel Storage (?)	1	10,000	283	19.2	5,434	7,651
27	Shop	1	157,500	4,460	10.3	45,938	64,681
28	Messhall	1	28,000	793	25.7	20,380	28,695
29	Dispensary	1	10,200	289	22.9	6,618	9,318
30	Warehouse	1	50,000	1,416	12.4	17,558	24,722
31	Garage	1	44,000	1,246	10.0	12,460	17,544
32	Administration	1	47,000	1,331	12.4	16,504	23,239

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Table 1 (continued)

Building Number	Type of Structure	Floors	Cubic Feet	Cubic Meters	Rubles Per Cubic Meter	Total Cost in Rubles	Total Cost 1955 US Dollars
33	Administration	2	121,000	3,426	19.5	66,807	94,064
34	Warehouse	1	7,200	204	15.0	3,060	4,308
35	Admin/Research	3	507,750	14,378	17.4	250,177	352,249
36	Research	1	14,000	396	19.7	7,801	10,984
37	Fabrication	1	244,200	6,915	6.4	44,256	62,312
	Sub-Total					1,342,358	1,890,039
Additional Costs not Included above:							
	Clearing & Grading of Site (5%) Utilities Lines (15%) Overall Engineering & Inspection (5%)	25%				335,389	472,510
	TOTAL FOR PLANT BUILDINGS AND UTILITIES					1,677,947	2,362,549
Ancillary Facilities:							
	Roads Within Plant 1.5 km @ 29,200 ru/km					43,800	61,670
	Fence 1,915 meters @ 5.2 ru/m					9,958	14,021
	2 possible Static Test Facilities (light steel construction)					90,000	126,720
	Sub-total for Ancillary facilities					143,758	202,411
	Overall Engineering & Inspection for Ancillary Facilities (5%)					7,188	10,121
	Total for Ancillary Facilities					150,946	212,532
TOTAL CONSTRUCTION COSTS FOR AL QAHIRAH ROCKET PLANT (#333)						1,828,893	2,575,081
					ROUNDED	1,800,000	2,600,000

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Table 2

Schedule of Construction Costs - Al Qahirah Rocket Plant (#333), UAR
Pre 1956- March 1964

(1955 US dollars)

Building Number	Type of Structure	Pre-1956	1956 - Feb 1960	Feb 1960- Jul 1963	Jul 1963- Mar 1964	Total
1	Fabrication	72,413				72,413
2	Explosives Storage	6,795				6,795
3	Explosives Storage	24,986				24,986
4	Explosives Storage	24,986				24,986
5	Explosives Storage	9,470				9,470
6	Explosives Storage	21,188				21,188
7	Explosives Storage	18,566				18,566
8	Explosives Storage	18,940				18,940
9	Explosives Storage	18,940				18,940
27	Shop	64,681				64,681
30	Warehouse	24,722				24,722
31	Garage	17,544				17,544
32	Administration	23,238				23,238
37	Fabrication	62,312				62,312
24	Shop		111,692			111,692
13	Shop			192,734		192,734
15	Research			36,155		36,155
18	Warehouse			5,977		5,977
19	Warehouse			5,977		5,977
20	Warehouse			5,977		5,977
21	Warehouse			5,977		5,977
22	Warehouse			5,977		5,977
23	Warehouse			5,977		5,977
25	Fuel Storage (?)			7,651		7,651
26	Fuel Storage (?)			7,651		7,651
29	Dispensary			9,318		9,318
33	Administration			94,064		94,064
34	Warehouse			4,308		4,308
36	Research			10,984		10,984
10	Shop				231,046	231,046
11	Shop				134,981	134,981
12	Shop				151,798	151,798

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Table 2 (continued)

(1955 US dollars)

Building Number	Type of Structure	Pre-1956	1956 - Feb 1960	Feb 1960- Jul 1963	Jul 1963- Mar 1964	Total
14	Office				5,857	5,857
16	Cooling Tower (possible)				46,816	46,816
17	Shop				19,397	19,397
28	Messhall				28,695	28,695
35	Admin/Research				352,249	352,249
Sub-total		408,781	111,692	398,727	970,839	1,890,039
Additional Costs not Included above:		408,				
Clearing & Grading of Site (5%)) Utilities Lines (15%)) 25% Overall Engineering & Inspection (5%))		102,195	27,923	99,682	242,710	472,510
Total		510,976	139,615	498,409	1,213,549	2,362,549

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CONSTRUCTION SCHEDULE OF AL QAHIRAH ROCKET PLANT (#333), UAR

Pre-1956 - March 1964*

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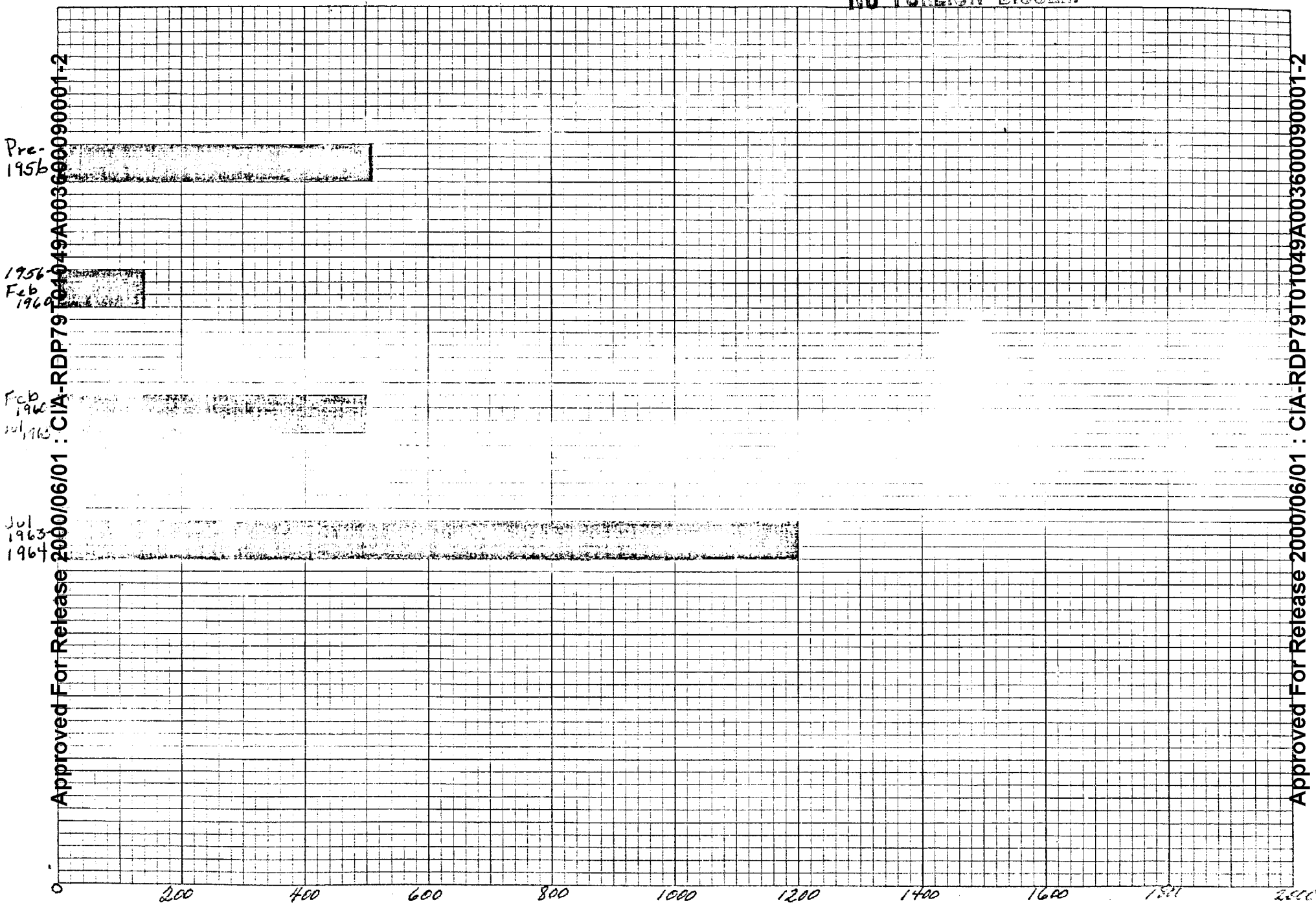

*This schedule includes buildings and utilities of the Plant, but excludes the ancillary facilities listed in Table 1.

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